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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/600,959	06/20/2003	Afzal M. Malik	SC12865TH	6580

23125 7590 04/04/2005

FREESCALE SEMICONDUCTOR, INC.
LAW DEPARTMENT
7700 WEST PARMER LANE MD:TX32/PL02
AUSTIN, TX 78729

EXAMINER

CHACE, CHRISTIAN

ART UNIT	PAPER NUMBER
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2189

DATE MAILED: 04/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/600,959

Applicant(s)

MALIK ET AL.

Examiner

Christian P. Chace

Art Unit

2189

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 January 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 13-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 20-22 is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-10 and 13-19 is/are rejected.
- 7) ☒ Claim(s) 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

This Office action has been issued in response to amendment filed 19 January 2005. Claims 1-10 and 13-22 are pending. Claims 1-6, 8-10 and 13-19 are rejected. Claim 7 is objected to, and claims 20-22 are allowed. Applicants' arguments have been carefully and respectfully considered, but they are not all persuasive. Accordingly, this action has been made FINAL.

Specification

The disclosure is objected to because of the following informalities:

In line 15 of page 8 of the instant specification, an "Address Tag Field or Tag Field" is recited. Line 21 of the same page recites, "The Tag Field." Are the "Address Tag" fields and the "Tag" fields the same tag fields?

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-6, 8-10, 13-16, and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Peters et al (US Patent 6,636,927).

With respect to independent claim 1, a method for configuring a prefetch buffer, comprising receiving a read request from a master, and, in response to the read request, selectively modifying a “total length of one (or more) prefetch buffer lines” (data size) of the prefetch buffer based on an attribute of the read request to an adjusted line size, the prefetch buffer having lines of differing total length during operation is disclosed in the abstract in the last ten lines, specifically. The “total length of one buffer line” is the same as the “data size” of Peters et al. “...that eliminates dedicating unused buffer storage to the replacement entry of the prefetch buffer” is an “intended use” limitation which the system of Peters et al inherently anticipates, as the explicitly anticipated apparatus is clearly able to eliminate dedicating unused buffer storage to the replacement entry of the prefetch buffer. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. MPEP 2114.

With respect to claim 2, the attribute of the read request comprising a master identifier corresponding to the master is disclosed in the abstract as a prefetch control register being associated with the a master device, the prefetch control register being associated with a particular master device inherently identifies the master.

With respect to claim 3, selectively modifying the total length of one or more prefetch buffer lines being “based on” a second attribute of the read request, wherein the second attribute comprises a data size is disclosed in the abstract as the prefetch size.

With respect to claim 4, the read request resulting in a miss in the prefetch buffer is disclosed in column 4, lines 38-40. When the prefetch buffer does not have the data, the data is not transferred from it, which is, by definition, a miss.

With respect to claim 5, the prefetch buffer including a plurality of lines, each of the lines having a “corresponding one” of “status fields,” is disclosed in column 3, lines 50-57. The prefetch control registers “correspond” to the buffers that have lines.

With respect to claim 6, selecting at least a portion of the plurality of lines as a “replacement entry” within the prefetch buffer based on the status fields of the prefetch buffer is disclosed in column 4, lines 41-47.

With respect to claim 8, selectively modifying the total length of one or more prefetch buffer lines comprising selectively modifying a line size of the replacement entry is disclosed in column 4, lines 41-47. If the buffer has different segments, each assigned to different masters, and, as discussed supra, each master has its own respective line size, then the line size of the “replacement entry” will be different than the original.

With respect to claims 9 and 16, selectively modifying the line size of the replacement entry comprising selectively modifying a status field corresponding to the replacement entry is disclosed in column 7, lines 29-31 as the register is programmable.

With respect to claim 10, selectively modifying the status field corresponding to the replacement entry being based on the attribute of the read request, the attribute comprising a data size is disclosed in column 8, line 42, for example, as the prefetch size.

With respect to claim 13, generating at least one data request to a memory addressed by the read request and storing data from the memory into the replacement entry of the prefetch buffer is disclosed in column 3, lines 50-57. Examiner notes that claim 13 merely describes how a buffer works, by definition.

With respect to independent claim 14, a method for configuring a prefetch buffer is disclosed in the abstract.

Receiving a read request to a memory from a requesting master, the read request having a “corresponding “ data size (prefetch size) and burst length (bursting is disclosed in column 2, line 33 and inherently has a length as discussed supra, is disclosed in column 3, lines 37-42 and 50-57.

Providing a prefetch buffer reconfiguration indicator “based on” the data size and the burst length is disclosed in column 3, lines 37-42.

Selecting a replacement entry within the prefetch buffer and based on the prefetch buffer reconfiguration indicator, selectively modifying total length of the replacement entry of the prefetch buffer based on an attribute of the read request to an adjusted line size and storing the data fetched from the memory in the replacement entry is disclosed in column 4, lines 41-47. Inherently, buffers are filled and emptied as needed – otherwise, once they filled, they would no longer be useful if the data in them is no longer needed by the master. Accordingly, the registers are programmable for future prefetches. “...that eliminates dedicating unused buffer storage to the replacement entry of the prefetch buffer” is an “intended use” limitation which the system of Peters et al inherently anticipates, as the explicitly anticipated apparatus is

Art Unit: 2189

clearly able to eliminate dedicating unused buffer storage to the replacement entry of the prefetch buffer. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. MPEP 2114.

With respect to claim 15, the prefetch buffer reconfiguration indicator being "based on" the data size (prefetch size), the burst length (discussed supra), and a master identifier corresponding to the requesting master (also discussed supra) is disclosed in column 3, lines 37-42 as the prefetch control register.

With respect to claim 19, generating at least one data fetch request to the memory wherein the at least one data fetch request is "based on" a bus width corresponding to a memory is disclosed in figure 5, #506. Data fetches are inherently "based on" a bus width in that only so much data can be fetched at a time, depending on the size (width) of the bus carrying it.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peters et al (cited supra) in view of Hicks et al (US Patent #6,085,291).

With respect to claims 17 and 18, Peters et al disclose the limitations of the claims upon which the instant claims depend. Peters et al disclose a status field in the prefetch registers.

The difference between Peters et al and the instant claims, however, are the explicit recitations of the status field comprising an address tag field, wherein selectively modifying the at least one status field comprises selectively modifying the address tag field as well as selecting the replacement entry within the prefetch buffer comprising checking a valid bit within the status field of the prefetch buffer.

However, Hicks et al disclose the address tag field and modification of same in figure 3, "ADR" as well as in figure 5, "LINE ADR." In addition, figure 5 shows the valid bit being a part of the stream address buffer.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, having the teachings of Peters et al and Hicks et al before him/her, to utilize the address tag field and valid bits of Hicks et al in the status field of Peters et al, because the address bit can be used to allocate the corresponding data into the buffer, as discussed by Hicks et al in column 6, lines 43-45, for example, as well as use of the valid bit in the status being used to indicate whether the stream (data) is allocated, as discussed by Hicks et al in column 6, line 50, for example.

Allowable Subject Matter

Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 20-22 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

With respect to claims 7 and 20, the claimed combination of fields is not taught or suggested by the cited prior art of record, nor is there any motivation to combine the fields that are actually disclosed, such as the valid field and address tag, as discussed supra, with the additionally claimed fields of the instant claims, such as, e.g., the “used” field. Claims 21-22 depend upon claim 20 and are allowable for at least the reasons set forth supra with respect to same.

Response to Arguments

With respect to applicants’ arguments regarding the length of the buffers of the instantly claimed invention being variable, while the buffer length of Peters et al are fixed. Examiner notes, however, that this is not commensurate in scope with the instant claim limitations – applicants recite, in the instant independent claims, “modifying total length of one or more prefetch buffer lines.” In order to anticipate this limitation, the prior art need only show one buffer line at a time of different sizes, not different sizing of entire buffers, as applicants argue instantly.

However, even if applicants did claim such features, examiner refers applicants to figure 5, which discloses a “specified prefetch size” in an associated control register.

With respect to applicants’ argument that because the recited invention dynamically varies the total length or line size to optimize buffer storage, the Peters et al reference does not anticipate the claimed invention. Examiner again notes that this

Art Unit: 2189

argument is not commensurate with the claim language – “selectively” may be different from “dynamically,” for example. However, examiner maintains that Peters et al indeed anticipates the claim language. The examiner has equated the “data size” of Peters et al to the “line size,” or “total length of one prefetch buffer line,” as is instantly claimed.

With respect to applicants’ argument that Hicks et al do not teach or suggest “selecting the replacement entry within the prefetch buffer comprising checking at least one of a valid, invalid, or used bits within status fields of the prefetch buffer,” or using an address tag field as a status field, examiner respectfully disagrees. It is also important to note that applicants have not clarified whether the address tag field and the tag field are the same field, as was requested in the previous Office action. The instant amendment to the specification does not clarify the question at all, nor do applicants attempt to clarify the point in their response. While the metes and bounds of the claim may be determined to satisfy 35 USC 112, 2nd paragraph, if the fields are not the same, there may be enablement and written description issues under 35 USC 112, 1st paragraph.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

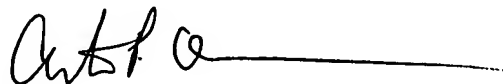
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christian P. Chace whose telephone number is 571.272.4190. The examiner can normally be reached on MAXI FLEX.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on 571.272.4201. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Christian P. Chace
Examiner
Art Unit 2189